AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A method for tracking objects in a sequence of video images, comprising the steps of:

storing, in a computer-readable storage medium, object models relating to objects detected in previous video images of the sequence, the object models comprising values of characteristic features of the detected objects and variances of those values;

receiving, in a computer, a further video image of the sequence to be processed;

detecting, utilizing the computer, objects in the received video image;

determining, utilizing the computer, characteristic features of the detected objects;

calculating, utilizing the computer, a distance measure between each detected object and each object model on the basis of the respective characteristic features using a distance function which takes into account at least the variance of the characteristic features;

matching, utilizing the computer, the detected objects to the object models on the basis of the calculated distance measures; and

updating, utilizing the computer, the object models using the characteristic features of the respective detected objects matched thereto[[.]];

wherein if a detected object is not matched to an object model then a new object model is stored corresponding to the detected object, and

the method further comprises counting, utilizing the computer, the number of consecutive video images for which each object is tracked, and outputting, utilizing the computer, a tracking

signal indicating that tracking has occurred if an object is tracked for a predetermined number of consecutive frames.

2. (original) A method according to claim 1, wherein the distance measure is a scaled Euclidean distance.

3. (original) A method according to claim 2, wherein the distance function is of the form:

$$D(l,k) = \sqrt{\sum_{i=1}^{N} \frac{(x_{li} - y_{ki})^2}{\sigma_{li}^2}}$$

for object model l and detected object k, where x_{li} and y_{ki} are values of the characteristic features of a stored object model and a detected object respectively, σ_{li}^2 is the corresponding component of the variance of each feature, and the index i runs through N features of an object model.

4. (original) A method according to claim 1, wherein the distance measure is the Mahalanobis distance.

5. (currently amended) A method according to claim 1, and further comprising the step of predicting, utilizing the computer, the values of the characteristic features of the stored object models for the received frame; wherein the calculating step uses the predicted values of the characteristic features as the feature values from the object models.

6. (previously presented) A method according to claim 1, wherein if an object model is not matched to a detected object then the variances of the characteristic feature values of that object are increased.

7. (previously presented) A method according to claim 1, wherein if an object model is not matched to a detected object in the received image then the updating step comprises updating the characteristic feature values with an average of each respective value found for the same object over a predetermined number of previous images.

8. (previously presented) A method according to claim 1, wherein if an object model is not matched to a detected object in the received image then a test is performed to determine whether the object is overlapped with another object, and the object is considered as occluded if an overlap is detected.

9. (canceled)

10. (currently amended) A method according to claim 1, wherein if an object model is not matched to a detected object in the received image then a count of the number of consecutive frames for which the object model is not matched is incremented, the method further comprising deleting, utilizing the computer, the object model if the count exceeds a predetermined number.

11.-12. (canceled)

13. (currently amended) A computer readable storage medium storing a computer program or at least one of a suite of computer programs ~~according to claim 12.~~which upon execution by a computer system performs a method for tracking objects in a sequence of video images, the method comprising:

storing, in a computer-readable storage medium, object models relating to objects detected in previous video images of the sequence, the object models comprising values of characteristic features of the detected objects and variances of those values;

receiving, in a computer, a further video image of the sequence to be processed;

detecting, utilizing the computer, objects in the received video image;

determining, utilizing the computer, characteristic features of the detected objects;

calculating, utilizing the computer, a distance measure between each detected object and each object model on the basis of the respective characteristic features using a distance function which takes into account at least the variance of the characteristic features;

matching, utilizing the computer, the detected objects to the object models on the basis of the calculated distance measures;

updating, utilizing the computer, the object models using the characteristic features of the respective detected objects matched thereto, wherein if a detected object is not matched to an object model then a new object model is stored corresponding to the detected object; and

counting, utilizing the computer, the number of consecutive video images for which each object is tracked, and outputting, utilizing the computer, a tracking signal indicating that tracking has occurred if an object is tracked for a predetermined number of consecutive frames.

14. (currently amended) A system for tracking objects in a sequence of video images, comprising:

storage means for storing object models relating to objects detected in previous video images of the sequence, the object models comprising values of characteristic features of the detected objects and variances of those values;

means for receiving a further video image of the sequence to be processed; and

processing means arranged in use to:

detect one or more objects in the received video image;

determine characteristic features of the detected objects;

calculate a distance measure between each detected object and each object model on the basis of the respective characteristic features using a distance function which takes into account at least the variance of the characteristic features;

match the detected objects to the object models on the basis of the calculated distance measures; and

update the stored object models using the characteristic features of the respective detected objects matched thereto,

wherein if a detected object is not matched to an object model then a new object model is stored corresponding to the detected object, and further comprising means for counting the number of consecutive video images for which each object is tracked, and means for outputting a tracking signal indicating that tracking has occurred if an object is tracked for a predetermined number of consecutive frames.

15. (original) A system according to claim 14, wherein the distance measure is a scaled Euclidean distance.

16. (original) A system according to claim 15, wherein the distance function is of the form:

$$D(l,k) = \sqrt{\sum_{i=1}^{N} \frac{(x_{li} - y_{ki})^2}{\sigma_{li}^2}}$$

for object model l detected object k where x_{li} and y_{ki} are values of the characteristic features of a stored object model and a detected object respectively, σ_{li}^2 is the corresponding component of the variance of each feature, and the index i runs through N features of an object model.

17. (original) A system according to claim 14, wherein the distance measure is the Mahalanobis distance.

18. (previously presented) A system according to claim 14, and further comprising means for predicting the values of the characteristic features of the stored object models for the received frame; wherein the processing means uses the predicted values of the characteristic features as the feature values from the object models within the distance measure calculation.

19. (previously presented) A system according to claim 14, wherein if an object model is not matched to a detected object then the variances of the characteristic feature values of that object are increased.

20. (previously presented) A system according to claim 14, wherein if an object model is not matched to a detected object in the received image then the updating step comprises updating the characteristic feature values with an average of each respective value found for the same object over a predetermined number of previous images.

21. (previously presented) A system according to claim 14, wherein if an object model is not matched to a detected object in the received image then a test is performed to determine if the object is overlapped with another object, and the object is considered as occluded if an overlap is detected.

22. (canceled)

23. (previously presented) A system according to claim 14, wherein if an object model is not matched to a detected object in the received image then a count of the number of consecutive frames for which the object model is not matched is incremented, the system further comprising means for deleting the object model if the count exceeds a predetermined number.

24. (canceled)

25. (new) A method according to claim 1, wherein the characteristic features comprise features describing the velocity, shape and color of each detected object.

26. (new) A method according to claim 25, wherein the characteristic features comprise the following features for each detected object:

the velocity (v);

the size *(s)*;

the ratio of the major-axis to minor-axis of the ellipse *(r)* that best fits the object;

the orientation of the major-axis of the ellipse (θ); and

the dominant color representation ($\mathbf{c}_p$).

27. (new) A system according to claim 14, wherein the characteristic features comprises features describing the velocity, shape and color of each detected object.

28. (new) A system according to claim 27, wherein the characteristic features comprise for each detected object: the velocity; the size; the ratio of the major-axis to minor-axis of the ellipse that best fits the object; the orientation of the major-axis of the ellipse; and the dominant color representation.

29. (new) The computer readable storage medium according to claim 13, wherein the distance measure is a scaled Euclidean distance.

30. (new) The computer readable storage medium according to claim 29, wherein the distance function is of the form:-

$$D(l,k) = \sqrt{\sum_{i=1}^{N} \frac{(x_{li} - y_{ki})^2}{\sigma_{li}^2}}$$

for object model l and detected object k, where x_{li} and y_{ki} are values of the characteristic features of a stored object model and a detected object respectively, σ_{li}^2 is the corresponding component of the variance of each feature, and the index i runs through N features of an object model.

31. (new) The computer readable storage medium according to claim 13, wherein the distance measure is the Mahalanobis distance.

32. (new) The computer readable storage medium according to according to claim 13, wherein the method further comprises predicting the values of the characteristic features of the stored object models for the received frame; wherein said calculating uses the predicted values of the characteristic features as the feature values from the object models.

33. (new) The computer readable storage medium according to claim 13, wherein if an object model is not matched to a detected object then the variances of the characteristic feature values of that object are increased.

34. (new) The computer readable storage medium according to claim 13, wherein if an object model is not matched to a detected object in the received image then said updating comprises updating the characteristic feature values with an average of each respective value found for the same object over a predetermined number of previous images.

35. (new) The computer readable storage medium according to according to claim 13, wherein if an object model is not matched to a detected object in the received image then a test is

performed to determine whether the object is overlapped with another object, and the object is considered as occluded if an overlap is detected.

36. (new) The computer readable storage medium according to claim 13, wherein if an object model is not matched to a detected object in the received image then a count of the number of consecutive frames for which the object model is not matched is incremented, and the method further comprises deleting the object model if the count exceeds a predetermined number.

37. (new) The computer readable storage medium according to claim 13, wherein the characteristic features comprise features describing the velocity, shape and color of each detected object.

38. (new) The computer readable storage medium according to claim 37, wherein the characteristic features comprise the following features for each detected object:

the velocity (v);

the size *(s)*;

the ratio of the major-axis to minor-axis of the ellipse *(r)* that best fits the object;

the orientation of the major-axis of the ellipse (θ); and

the dominant color representation ($\mathbf{c}_p$).